

## ABSTRACT

A plurality of data signals are received over an antenna array having a plurality of antenna elements. The data signals are transmitted over a shared spectrum in a wireless communication system. A signal having each of the data signals is received over each antenna element. The plurality of data signals are grouped into a plurality of groups. The received signals of the antenna elements are matched filtered for a first group of the plurality of groups, producing a matched filtered result. Data is jointly detected of the first group using the matched filtered result. An interference correction signal is constructed using the detected data for each antenna element. The interference cancelled result is subtracted from the received signal of each antenna element, producing an interference cancelled result for each antenna element. Data is successively detected for remaining groups using the interference cancelled result for each antenna element.